2タイプの方略 : 日本人学習者による英語wh疑問文習得

Kumagami, Mai
Graduate School of Humanities, Kyushu University

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Two Types of Strategies: The Acquisition of English *Wh*-Questions by Japanese Learners

Mai Kumagami
(Graduate School of Humanities, Kyushu University)
kumagami@lit.kyushu-u.ac.jp

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1. Introduction

There are many differences in *wh*-questions among languages observed and analyzed, so that the acquisition of *wh*-questions has been one of the main issues in the study of Second Language Acquisition (henceforth SLA). Inspired by the Principles & Parameters approach, the main issue in the 90's was whether parameters were able to be reset. This question is reduced to the question of whether syntactic features are available in learners' interlanguage grammars (henceforth ILGs) in the framework of the Minimalist Program (henceforth MP). However, there have been few SLA studies within the MP framework.

The present study investigates the acquisition of *wh*-questions within the MP framework, and claims that learners use some economical strategies, in the early stage of SLA, and even in SLA, the strategies differ between production and interpretation.

The article is organized as follows. Section 2 describes the differences of *wh*-questions between English and Japanese. In section 3, we will look at previous studies, and hypothesize that there are two types of strategies in SLA in order to explain issues that arise from previous studies. Section 4 shows the experiment and the results in this study. Section 5 considers whether the results can be explained by the analysis hypothesized in this study.

2. Differences in *Wh*-Questions between English and Japanese

It is broadly known that a *wh*-phrase must be fronted in English *wh*-questions; *what* and *who* in the embedded clauses have to move to the initial positions of sentences such as (1a, b). On the other hand, Japanese *wh*-questions do not require the *wh*-phrase to move to the initial position of a sentence; *nani-o* and *dare-ga* in the embedded clauses do not have to move to the initial positions in sentences like (2a, b).

(1) a. What$_i$ do you think [t_i is in the bag]?
b. Who$_i$ do you think [Mary loves t_i]?
c. *Do you think [what is in the bag]?
d. *Do you think Mary loves who?

(2) a. anata-wa [Mary-ga nani-o suki ka] shitte imasu ka?
you-Top Mary-Nom what-Acc like Q-prt know Q-prt
'What do you know Mary likes?'
b. anata-wa [dare-ga Mary-o suki ka] shitte imasu ka?
you-Top who-Nom Mary-Acc like Q-prt know Q-prt
'Who do you think likes Mary?'

It is generally assumed that a *wh*-phrase in English bi-clausal *wh*-questions like (1) first moves to the intermediate CP Spec of the embedded clause, and then to the higher CP Spec of the matrix clause.

In *wh*-questions which have more than one *wh*-phrase, i.e., multiple *wh*-questions, only one *wh*-phrase moves to the matrix CP Spec in English (see (3)). Moreover, there is a *wh*-island effect and *wh*-phrases cannot be extracted from embedded interrogative clauses, as shown in (4).

(3) a. Bill knew who broke what.
b. Who$_i$ did Bill know t_i broke what?

(4) a. Bill wondered when John ate an apple.
b. *What$_i$ did Bill wonder when John ate t_i?

Just like in English, the extraction of *wh*-phrases from a *wh*-island is

prohibited in Japanese. The question (5b) transformed from (5a) is a yes-no question, allowing the *wh*-phrase, *nani-o*, to be interpreted only in the embedded clause. The answer (5c), thus, is impossible.

(5) a. Bill-wa [John-ga nani-o katta ka] shiritagatte imasu.
Bill-Top John-Nom what-Acc bought Q-prt know want
b. Bill-wa [John-ga nani-o katta ka] shiritagatte imasu ka?
Bill-Top John-Nom what-Acc bought Q-prt know want Q-prt
c. *Hon-o desu.
book-Acc Cop
'(It's) a book.'

It seems that there is no difference between English and Japanese multiple *wh*-questions in terms of *wh*-island effects. However, there is an obvious difference between these two languages with respect to the Superiority condition that a lower *wh*-phrase cannot move prior to a higher *wh*-phrase in multiple *wh*-questions. In English, *who* in (6a) is in the higher position. Consequently, the structure (6b) violates the Superiority condition since a lower *wh*-phrase *what* moves prior to *who*.

(6) a. Who bought what?
b. *What$_i$ did who buy t_i?

However, this condition is not present in Japanese (see (7)); either *wh*-phrases in (7) can precede the other.

(7) a. Dare-ga nani-o kaimasita ka?
who-Nom what-Acc bought Q-prt
'Who bought what?'
b. Nani-o dare-ga kaimasita ka?
what-Acc who-Nom bought Q-prt

Consider first the motivation of *wh*-movement in English. According to

Radford (1997), which adopts Chomsky (1995), an interrogative C has strong [+Q] and [+wh] features in English. The strong feature in C, which must be eliminated before LF, triggers overt movement and attracts a *wh*-phrase to check off [+wh]. Additionally, the strong [+Q] feature in C triggers movement of the dummy *do* from I to C, that is an I-to-C movement. On the other hand, in languages that have no strong [+wh] features like Japanese, *wh*-phrases do not have to move overtly. The distinction in "feature strength" turns out to be a stipulation and not an explanation. So Chomsky (1995) changes the notion and claims that "strong" features must be checked off before spell-out because they are "uninterpretable" formal features at the LF interface.

Let us next turn to the Superiority effect. It is cross-linguistically assumed by the MP that movement is constrained by the principle in (8).

(8) Attract Closest Principle/ACP:
A head which attracts a given kind of constituent attracts the *closest* constituent of the relevant kind
(Radford 2004: 162)

The property of English *wh*-movement that only one *wh*-phrase moves to the sentence initial position is explained by this principle stated in (8). A matrix C head having strong [+wh] attracts the closest *wh*-phrase, and the checking requirement would be satisfied.

3. Previous Studies of SLA of English *Wh*-interrogatives

3.1. Hawkins and Hattori (2006)

The wide variety of properties of *wh*-questions has interested many researchers, and there are many studies investigating various aspects of the construction including SLA. In the 90s, the main questions for SLA concerning *wh*-questions were whether L2 learners obeyed the principles of Universal Grammar, in particular, Subjacency, and whether +/- *wh*-movement parameters were able to be reset. Within the MP framework, those questions have been reduced to the questions of whether syntactic

features are available in ILGs and how ILGs obey the universal principles.

Stressing that caution is required in interpreting apparent target-like L2 performance as evidence for the acquisition of underlying properties of grammar assumed to be present in the grammar of native speakers, Hawkins & Hattori (2006) argues that uninterpretable *wh*-features disappear in SLA in the case where those features have not been selected from UG inventory during the critical period.

They investigate the sensitivity of high proficiency Japanese learners of English to the Attract Closest Principle as defined in (8). Hawkins & Hattori (2006) assumes that *wh*-movement in English is motivated by the uninterpretable feature [*u*wh], and predicts that the feature disappears in SLA of adult Japanese learners. Nineteen subjects who adequately interpreted long-distance *wh*-questions in a syntax test were required to choose the possible answer(s) to the question after reading the given stories as in (9) below.

(9) a. Sophie was angry. Her holiday had been ruined because the hotel she had booked through a travel agency was full, and she had to sleep in a tent. Sophie's brother was a friend of Norman who owned the travel agency. He spoke to Norman on Thursday and told him that Sophie would be phoning his manager, Mrs. Smith, the following day to ask for her money back.

b. Question: Who did Sophie's brother warn Sophie would phone when?

c. Answer 1: He warned Norman that Sophie would phone on Friday.
Answer 2: He warned that Sophie would phone Mrs. Smith on Friday.
Answer 3: He warned Norman on Thursday that Sophie would phone.

(Hawkins & Hattori 2006: 286-287)

Answer 1 is pragmatically plausible and has no syntactic violation. Answer 2 is also pragmatically plausible, but violates Superiority. Answer 3

is syntactically impossible, but pragmatically plausible. Hawkins & Hattori (2006) uses 5 types of multiple *wh*-questions, with the structure shown in (10). (10a) only allows an embedded interpretation of the *wh*-phrase, and has no syntactic violation. In (10b), *when* can be interpreted both in the matrix and embedded clause. (10c-e) only allow the matrix interpretation of the sentence initial *wh*-phrase, and violate Superiority, Subjacency, and both respectively.

(10) a. Who did the head teacher suspect [<who> had taken what]?
b. When did Henry remember <when> [Louise had lost what <when>]?
c. Who did Sophie's brother warn <who> [Sophie would telephone *<who> when]?
d. When did Rupert discover <when> [who Nora had met <who> *<when>]?
e. Who did the weather office warn <who> [when the hurricane might strike *<who><when>]?

(Hawkins & Hattori 2006: 288)

The subjects chose the interpretation that violates Superiority, Subjacency, or both. Even though the number of subjects who accepted Subjacency violations was less than the number of those who violated Superiority, the difference was not statistically significant. One subject judged adequately, yet he appeared to prefer the matrix scope reading.

Hawkins & Hattori (2006) argues that the Japanese learners of English have no [*u*wh*] [1] feature but [*u*Foc*] feature, which motivates one *wh*-phrase to move to FocP. Their vital assumption is that all *wh*-phrases which are assigned [Foc] feature are equidistant in the same clause from the lower FocP, but not from the higher FocP. Hawkins & Hattori (2006) gives an account for the sensitivity of learners to the *wh*-island violation, based

[1] [*u*wh*] appears to mean that the value of feature strengthen in question is strong, though Hawkins & Hattori (2006) gives no clear account of it.

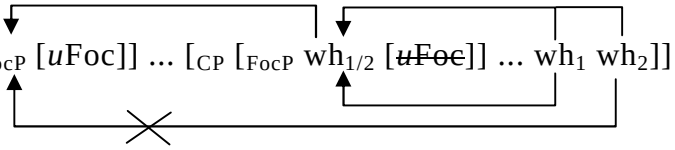
on their assumption about the distance from FocP to *wh*-phrases and the Attract Closest Principle; *wh*-phrase *who* that moved to the left periphery of the embedded clause is closest to the higher FocP, and the movement of *when* to the top position of the sentence violates the principle. Analysis of Hawkins & Hattori (2006) is illustrated in (11).

(11) Analysis of Hawkins & Hattori (2006):

a. Japanese learners of English use [*u*Foc] instead of [*u*wh]

b. All *wh*-phrases which are assigned [Foc] feature are equidistant in the same clause from the lower FocP, but not from the higher FocP

c. $[_{CP}\ [_{FocP}\ [u\text{Foc}]]\ \ldots\ [_{CP}\ [_{FocP}\ \text{wh}_{1/2}\ [\sout{u\text{Foc}}]]\ \ldots\ \text{wh}_1\ \text{wh}_2]]$



Their account seems to be valid regarding the argument that attention is required for both failure and success in acquisition, in accord with their claim that "caution is required in interpreting apparent target-like L2 performance as evidence for the acquisition of underlying properties of grammar assumed to be present in the grammar of native speakers." (Hawkins & Hattori 2006: 298)

In the following sections, however, we will point out a few facts that cannot be explained by Hawkins & Hattori's (2006) analysis.

3.2. Further Facts to be considered

In this section, we introduce and examine two studies, which attempt to explain SLA of *wh*-questions by intermediate learners, within the MP framework. These studies analyzed learners' errors. Such error analysis is, of course, an important approach to shed light on the mechanism of SLA. The approach includes the possibility of inconsistency in interpreting learners' abilities, as it disregards the case where learners' abilities produce some errors and also accidentally leads to target-like performance. We, therefore, will just see facts which cannot be explained by the Hawkins & Hattori's (2006) analysis, but will not examine the analyses of errors here.

First we will look at Wakabayashi & Okawara (2003), which investigates the acquisition of English long-distance *wh*-questions by Japanese learners. It is often pointed out that at an early stage of First Language Acquisition (henceforth FLA), some children produce long-distance *wh*-questions with the *wh*-phrase partially moved to the intermediate CP, and a dummy *wh*-phrase inserted at the initial position of the sentences (Crain & Thornton (1998)). Thus, it is not surprising that the same kind of partial *wh*-movement is observed in SLA. Wakabayashi & Okawara (2003) tested university students with a production task, which was almost identical to Crain & Thornton's (1998). They used several colored figures with names such as Mr. Blue and Mr. Yellow, and put one of the figures in the box. Then the participants were required to ask Mr. Blue what he thought was in the box.

(12) Target sentences:

a. What do you think is in the bag? <subject what>
b. Who do you think loved Mr. Yellow? <subject who>
c. What do you think Mr. Yellow eats? <object what>
d. Who do you think Mr. Yellow loved? <object who>

(13) Results:

a. Do you think what is in the bag?
b. Do you think who Mr. Yellow loved?
c. What do you think who loved Mr. Yellow?
d. What do you think who did he love?

(modified from Wakabayashi & Okawara 2003: 231)

Wakabayashi & Okawara (2003) compared the Japanese learners' grammar with the adult/child English grammars, and explained the errors of the learners as follows. In errors like (13a, b), [+Q] in the matrix C is strong and triggers the movement of *do*, but [+wh] is not strong, which explains why the *wh*-phrase does not move to the Spec position of the matrix CP. The motivation that *wh*-phrases move to the intermediate Spec CP is the requirement for an operator in the specifier position. The head with an

operator in its specifier position has a strong [+Q]. The movement of intermediate *wh*-phrases in (13c, d) is explained on the assumption that intermediate C has strong [+wh]. On the other hand, as the *wh*-phrase that is situated at the initial position of the sentences is always *what*, Wakabayashi & Okawara (2003) considers this *what* as a dummy (or expletive) element that is inserted in that position (see (14)).

(14) $[_{CP}$ What $[_{C}$ do] $[_{TP}$ you think $[_{CP}$ who$_i$ $[_{TP}$ ~~who$_i$~~ loved Mr. Yellow]]]?
(Wakabayashi & Okawara 2003: 235)

One of their interesting findings is that learners prefer to short-move of *wh*-phrases, similar to children in FLA. This finding leads them to generalize that when the feature strength is different between the target grammar and learners' L2 grammar, the feature in the learners' L2 grammar becomes weak. However, the explanation on the strength of features is inconsistent with their account for (13c, d).

The hypothesis of Hawkins & Hattori (2006) does not predict the failure of the successive cyclic *wh*-movement like (13); the [*u*Foc*] feature in the left periphery of an embedded clause attracts a *wh*-phrase in the clause, and the higher [*u*Foc*] feature attracts the *wh*-phrase to the sentence initial position. So, their hypothesis cannot account for this fact (see (15)).

(15) $[_{CP}$ $[_{FocP}$ wh [*u*Foc*]] … $[_{CP}$ $[_{FocP}$ <wh> [*u*Foc*]] … <wh> …]]

We will next look at the L2 performance with more than one *wh*-phrase, which is reported by Yusa (1999). Yusa (1999) investigates the sensitivity of Japanese university students to English *wh*-island effects. Although Yusa's (1999) experiment consisted of seven tasks, we will look at two of them, as they are more closely related to the analysis of Hawkins & Hattori (2006). One is the comprehension task which required the participants to choose all right answers from choices like (16c) to questions like (16b), after reading the given story like (16a).

(16) a. This boy loved to climb trees in the forest. One day he slipped and fell to the ground. He picked himself up and went home. That night when he had a bath, he found a big bruise on his arm. He said to his Dad, 'I must have hurt myself when I fell this afternoon!'

b. When did the boy say how he hurt himself?

c. (i) in the evening.

(ii) in the afternoon.

(iii) by falling to the ground.

(modified from Yusa 1999: 304)

The answer (i) is both syntactically and pragmatically plausible, while the answer (ii), although pragmatically plausible, is syntactically impossible, because the interpretation of *when* in the embedded clause violates the *wh*-island condition. The answer (iii) replies to the intermediate *wh*-phrase *how*, and is not appropriate for the question. The results of this task are shown in (17).

(17) a. When did the boy say (40%) that he fixed the car (20%)? (40%)[2]

b. When did the boy say (60%) how he fixed the car (12%)? (20%)

c. Who did the boy ask (44%) how to help (20%)? (28%)

d. How did the boy ask (44%) what to cook (16%)? (28%)

(modified from Yusa 1999: 304)

Since the high proficient learners in Hawkins & Hattori (2006) chose the matrix interpretation of sentence-initial *wh*-phrases, which violates Subjacency, it is unnatural to think that the lower proficient learners adequately judged the ungrammaticality of the embedded interpretation. Both Hawkins & Hattori (2006) and Yusa (1999) give no clear account for

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[2] The numbers in parentheses inserted in the sentences represent percentages that the subjects interpreted sentence initial *wh*-phrases in a matrix or an embedded clause. The numbers in the right most parentheses represent percentages of other answers.

the fact that some learners prefer the matrix reading of sentence-initial *wh*-phrases, we will consider about it in the next section.

Another task picked up here is the question formation task. The subjects in Yusa's (1999) study were asked to form indirect questions from (18a), by using two *wh*-phrases *who* and *what*. In addition to the target sentences, they form the questions shown in (19).

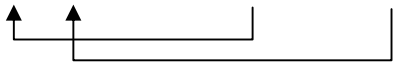
(18) a. I wonder + [John first bought the book]
b. I wonder who first bought what.
(19) a. *I wonder who what first bought.
b. *I wonder what who first bought.
c. *I wonder who and what first bought.
d. *I wonder what and who first bought.

(modified from Yusa 1999: 305)

The subjects who incorrectly allowed long-distance movement in (17) tended to form questions like (19) and those who correctly produced the sentences with short-movement tended to form questions like (18b). Yusa (1999) assumes that Japanese is a language in which *wh*-phrases move to multiple Specs of IP, having [+multiple] on I. He argues that Japanese learners transfer [+multiple] to C in English, and use multiple Specs of CP. His conclusion that such transfer may cause learners' *wh*-island violation, however, is not compatible with the results that appear to be successful in his experiment.

According to Hawkins & Hattori (2006), as the learners obey the Attract Closest Principle, they are more sensitive to the *wh*-island condition than the Superiority condition. The result of the first task of Yusa (1999) appears to be consistent with their assumption. However, their hypothesis cannot explain the result of the second task; the learners formed sentences like '**I wonder who what first bought*'. The hypothesis of Hawkins & Hattori (2006) predicts that the checking requirement of the embedded [*u*Foc*] is satisfied with the subject *wh*-phrase *who*, and does not lead to the failure of such question formation.

(20) [… [$_{CP}$ [$_{FocP}$ wh_i wh_j [*u*Foc*]] <wh_i> …<wh_j>]]



3.3. Alternative Analysis

There are mainly two differences between Hawkins & Hattori (2006) and other two, Wakabayashi & Okawara (2003) and Yusa (1999); (i) the proficiency of participants, and (ii) the experimental tasks. The two facts shown in (13) and (19), which cannot be explained by Hawkins & Hattori's (2006) analysis, were observed in the production of *wh*-questions by intermediate learners. Hawkins & Hattori's (2006) analysis, on the other hand, were proposed to account for the interpretation of *wh*-questions by advanced learners. Thus, even though the Analysis of Hawkins & Hattori (2006) is plausible, at least two questions that arise from these differences need to be answered, i.e., is the other analysis required to explain the performance of intermediate Japanese learners of English and is the other analysis required to explain the production of Japanese learners of English?

As shown in Wakabayashi & Okawara (2003), learners tend to prefer 'short move' in the production; they prefer 'partial movement'. From the view of MP, insertion of expletive *wh*-phrase into the top position is more economical than moving *wh*-phrase; the former includes the operation Merge, but the latter includes the operations Attract and Merge.

White (1992) suggests that a 'non-movement' stage is present in SLA, where learners whose L1 lacks overt *wh*-movement acquire a language that *wh*-phrases overtly move. In this non-movement stage, learners use a null pronoun *pro* with base-generated *wh*-phrase as its antecedent, but at later stages they use *wh*-variables. It is, therefore, natural to hypothesize that learners use more economical strategies in SLA.

As for the interpretation, on the other hand, intermediate learners tend to prefer 'detect nearest'; the learners chose the matrix interpretation of the sentence initial *wh*-phrase more than the embedded interpretation in Yusa (1999). In psycholinguistic research, it is generally known that shorter *wh*-dependencies are preferred (Phillips, Kazanina and Abada (2005)). Then, assume that shorter dependencies are also favored in SLA, and that learners

use some economical strategy which reduces a load of processing.

It has been partly recognized that learners use different strategies between production and interpretation. But there have been few studies that systematically formulate those different strategies. Note that a better understanding of those differences leads to a better grasp of the variation of SLA. The present study, therefore, assumes that intermediate learners may have the same feature configuration as natives, but cannot produce or interpret sentences as natives, using the different strategies. First we assume that they use the 'Short movement' strategy in earlier stages of SLA, as shown in (21).

(21) **Strategy for production:**

'Short movement' strategy:

$[_{CP}$ wh… $[_{CP}$ <wh> …<wh> ...]]]

insertion

The error of 'partial movement' may occur in the first stage shown in (21). Learners may acquire the successive cyclic movement through a sufficient amount of L2 input.

As for interpretation, we assume that intermediate learners use the 'Detect nearest' strategy, as illustrated in (22). They detect the base position of a sentence initial *wh*-phrase within a matrix clause, and upon advancing to the next stage they can detect the base position of a *wh*-phrase within an embedded clause as well.

(22) **Strategy for interpretation:**

'Detect nearest' strategy:

$[_{CP}$ wh_i … t_i $[_{CP}$ …t_i]]

The analyses illustrated in (21) and (22), thus, give an account of the facts in previous studies. However there is a huge difference among individuals in terms of achievement in SLA. There is also a difference in performance between production and interpretation of *wh*-questions by L2

learners. Therefore, some cautious experiments both in production task and construal should be designed to confirm the hypothesis proposed here. In the next section, we will set forth experiments conducted to test the adequacy of the analyses in (21) and (22).

4. Experiment

The aim of the experiment in this study is to test the hypothesis shown in the last section. In the following sections, the experiment and its results will be shown. The experiment consists of two parts; (i) the first experiment is on long-distance *wh*-questions, (ii) the second is on bi-clausal multiple *wh*-questions.

4.1. Participants

Thirteen students in Kyushu University (Japanese learners of English; JE) participated in this experiment (7 women, 6 men; age range: 20-26, no history of residence in English-speaking countries)[3]. None have been in English speaking countries for more than 1 month. As control group, 5 native speakers of English (NE) (5 men; age range: 21-24) participated in the experiment as well.

[3] TOEFL score available only for one participant was 537. TOEIC score was available for 3: 565-800. And the STEP test grade was available for 9: third grade (3 participants), pre-second (1), second (4), and pre-first (1).

4.2. Experiment 1

4.2.1. Grammaticality judgment task

Materials

The materials consist of 4 types of long-distance *wh*-questions as follows.

(23) a. What$_i$ did you think [t_i scratched Bob]? <matrix>
b. What$_i$ did you say [Sam broke t_i]? <matrix>
c. *Did you think what$_i$ [t_i scratched Bob]? <intermediate>
d. #Did you say what$_i$ [Sam broke t_i]? <intermediate>

(23a, b) are grammatical *wh*-questions, where subject/object adequately moves to the top position of sentences. The example like (23c), however, is ungrammatical since *wh*-phrases inadequately move to the intermediate position.

Procedure

The participants were required to judge the acceptability of long-distance *wh*-questions. They were asked to rate the 32 questions (8 token of 4 types) from 1 (completely unacceptable) to 4 (completely acceptable). The items were shown with 32 dummy items and randomized.

(24) a. *Mr. Green said Sam broke something. You want to ask Mr. Green what he said Sam broke.*
"What did you say Sam broke?"
b. *Mrs. Smith thought something scratched Bob. You want to ask Mrs. Smith what she thought scratched Bob.*
"What did you think scratched Bob?"

The prediction is that L2 learners who have correctly acquired this *wh*-construction accept only (23a, b), because the task implicitly requires them to choose *wh*-questions.

Group Results

The results are as illustrated in Table 1. JE rated the sentences like (23a, b) as acceptable and the sentences like (23c, d) as unacceptable. On the other hand, NE accepted (23a, b, d), and rejected (23c).

Table1. Mean rating of grammaticality on a scale from 1(completely unacceptable) to 4 (completely acceptable)

Condition / Group	JE	NE
(i) matrix-*think* (23a)"*What did you think scratched Bob?*"	3.413	3.850
(ii) matrix-*say* (23b)"*What did you say Sam broke?*"	3.279	3.775
(iii) intermediate-*think* (23c)"**Did you think what scratched Bob?*"	2.279	1.175
(iv) intermediate-*say* (23d)"*#Did you say what Sam broke?*"	2.288	2.700

A 2 (movement to matrix or intermediate; movement) × 2 (*think* or *say*; verb-type) ANOVA was applied to the mean choice of answers. As for JE, the main effect of movement was significant ($F_1(1,12)=12.544$, $p<.005$, $F_2(1,7)=175.237$, $p<.001$), but the main effect of verb-type was not significant ($F_1(1,12)=1.040$, *n.s.*, $F_2(1,7)=1.194$, *n.s.*). The interaction between movement and verb-type was not significant ($F_1(1,12)=0.717$, *n.s.*, $F_2(1,7)=1.113$, *n.s.*).

The result of NE was analyzed in the same way. Both the main effect of movement ($F_1(1,4)=209.302$, $p<.001$, $F_2(1,7)=837.766$, $p<.001$) and verb-type ($F_1(1,4)=9.055$, $p<.05$, $F_2(1,7)=107.036$, $p<.001$) were significant. The interaction of two factors was also significant ($F_1(1,4)=16.158$, $p<.05$, $F_2(1,7)=89.600$, $p<.001$). For movement, the simple main effect of verb-type *think* ($F_1(1,8)=126.859$, $p<.001$, $F_2(1,14)=631.047$, $p<.001$) and verb-type *say* ($F_1(1,8)=20.488$, $p<.005$, $F_2(1,14)=101.913$, $p<.001$) were significant. For verb-type, on the other hand, the simple main effect of movement to intermediate ($F_1(1,8)=23.814$, $p<.005$, $F_2(1,14)=192.941$,

p<.001) was significant, but that of movement to matrix was not (F_1(1,8)=0.058, *n.s.*, F_2(1,14)=0.467, *n.s.*).

4.2.2. Production task

Materials

The target sentences that this production task expects to elicit are illustrated in (25).

(25) Target sentences:

a. What$_i$ did Mrs. Smith remember t_i scratched Bob?

b. Who$_i$ did Mrs. Smith say t_i loved Bob?

c. What$_i$ did Mr. Davis remember Sue made t_i?

d. Who$_i$ did Mr. Davis say Sue trusted t_i?

In (25a, b), subject *wh*-phrases are extracted, whereas object *wh*-phrases are displaced from the embedded clauses in (25c, d). Two verbs, *remember* and *say*, are used.

Procedure

The task requires the subjects to form *wh*-questions that ask the underlined items in the given declaratives.

(26) a. Mrs. Smith remembered <u>the cat</u> scratched Bob.

b. Mr. Davis said Sue made <u>a cake.</u>

There are four types of expected questions as in (25). Each type has 4 tokens. The participants were asked to produce *wh*-interrogatives from 16 declarative sentences.

Results

In both subject long-distance and object long-distance tasks, only 4 subjects correctly formed *wh*-questions in JE. Others formed inadequate or unexpected questions as follows. Some subjects formed mono-clausal ones

like (27a). (27c, d, e) are the errors that Wakabayashi & Okawara (2003) called 'partial movement'.

(27) a. What scratched Bob?
b. Mrs. Smith remembered who loved Bob?
c. Did Mrs. Smith remember who loved Bob?
d. What did Mr. Brown say which surprised Sue?
e. What did Mrs. Green remember what Bob read?
f. What scratched Bob did Mrs. Smith remember?
g. What Sam broke did Mrs. Green say?
h. What Mrs. Green remembered did Bob read?
i. Who Mrs. Smith remembered loved Bob?

The results of NE shown in (28a, b) are in line with our prediction. Only one native speaker produced sentences like (28c, d). There was no interpretation that asks items represented by *wh*-phrases. The subjects might have misread the instructions of the task.

(28) a. What did Mrs. Smith remember had scratched Bob?
b. Who did Mrs. Green say that Sam invited?
c. Did Mrs. Green say who Sam invited?
d. Did Mrs. Smith remember who loved Bob?

4.3. Experiment 2

Materials

Following Hawkins & Hattori (2006), the present study uses three types of sentences. In (29a), both matrix and embedded interpretations of a *wh*-phrase in the sentence initial position are possible, while the other two have only embedded interpretation. The extraction of *who* from an embedded clause violates the Superiority condition, as *when* is adjoined to a position higher than *who*, as illustrated in (29b). The Subjacency violation is illustrated in (29c); with *when* extracted from an embedded interrogative clause, i.e., a *wh*-island.

(29) a. When$_i$ did Bob remember t_i [Sarah had lost what t_i]?
b. Who$_i$ did Bob warn t_i [Sarah would phone *t_i when]?
c. When$_i$ did Bob disclose t_i [who$_j$ Sarah had met t_j *t_i]?

Procedure

The task is a truth value judgment task. The subjects are required to choose all correct answers, given a context and question. One answer has the matrix interpretation of the initial *wh*-phrase, and another has the embedded interpretation. Each type of question illustrated in (29) has 4 tokens, 12 in total. When the subjects are presented with questions like (29a), both answers are possible. For (29b, c), both answers are pragmatically plausible, but only one answer, which has the matrix interpretation of the top *wh*-phrase, is syntactically possible.

(30) *Sarah lost the book on Monday. On Friday, Bob remembered Sarah had lost it on Monday.*
Q: When did Bob remember Sarah had lost what?
A1: On Friday, Bob remembered that Sarah had lost the book.
A2 Bob remembered that Sarah had lost the book on Monday.

Results

Each answer chosen by the subjects is given a score of 1 and each answer not chosen, a score of 0. Group means are calculated for responses to each of the two answers. The results are as illustrated in Table2.

Table2. Mean choice of answers

	JE		NE	
	Matrix	Embedded	Matrix	Embedded
(29a)	0.923	0.212	0.950	0.100
(29b)	0.788	0.462	0.800	0.200
(29c)	0.942	0.173	1.000	0.000

A 2 (matrix or embedded; scope) × 3 (no-violation, superiority

violation, or subjacency violation; violation-type) ANOVA was applied to the mean choice of answers of each group. As for JE, the main effect of scope was significant ($F_1(1,12)=42.994$, $p<.001$, $F_2(1,3)=26.944$, $p<.05$), but that of violation-type was not ($F_1(1,12)=0.935$, *n.s.*, $F_2(1,3)=1.045$, *n.s.*). The interaction of two factors was significant ($F_1(2,24)=10.876$, $p<.001$, $F_2(2,6)=6.662$, $p<.05$). For scope, the simple main effect of no-violation ($F_1(1,36)=41.695$, $p<.001$, $F_2(1,9)=25.939$, $p<.001$), superiority violation ($F_1(1,36)=7.797$, $p<.01$, $F_2(1,9)=4.851$, $p<.10$), and subjacency violation ($F_1(1,36)=48.731$, $p<.001$, $F_2(1,9)=30.316$, $p<.001$) were all significant. For violation, the simple main effect of matrix ($F_1(2,48)=3.635$, $p<.05$, $F_2(2,12)=2.737$, *n.s.*) and embedded ($F_1(2,48)=9.909$, $p<.001$, $F_2(2,12)=7.463$, $p<.01$) were significant.

As for NE, the main effect of scope was significant ($F_1(1,4)=77.452$, $p<.001$, $F_2(1,3)=654.818$, $p<.001$), but that of violation was not ($F_1(1,4)=1.000$, *n.s.*, $F_2(1,3)=1.000$, *n.s.*). And the interaction of two factors was not significant ($F_1(2,8)=4.261$, *n.s.*, $F_2(1,3)=2.492$, *n.s.*).

5. Discussion

The present study hypothesizes that Japanese learners of English use the economical strategies in the early stage of SLA, and the strategies are different between production and interpretation. Let us consider whether the results of the production tasks can be explained by the analysis proposed in this study, as repeated in (31) and (32).

(31) **Strategy for production:**

'Short movement' strategy:

$[_{CP}$ wh… $[_{CP}$ <wh> …<wh> ...]]]

insertion

(32) **Strategy for interpretation:**

'Detect nearest' strategy:

$[_{CP}$ wh_i … t_i $[_{CP}$ …t_i]]

In Experiment 1, NE preferred the same structure, e.g. *What did Mrs. Smith remember had scratched Bob?*, in both the judgment and production tasks. JE, on the other hand, did not show the consistency in their response. Most of them considered the structure like *What did Mrs. Smith remember had scratched Bob?* preferable in the judgment task, but produced the 'partial movement' structure, e.g. *What did Mrs. Green remember what Bob read?*, in the production task. This type of production is shown in Wakabayashi & Okawara (2003), and discussed in section 3 in the present study. A *wh*-phrase moves to Spec CP of an embedded clause to check the uninterpretable *wh* feature. The requirement of feature checking of the feature in a matrix clause is satisfied by the insertion of *what*. The result of 'partial-movement' suggests that learners prefer to 'short-move' in the earlier stage of the acquisition. And they can acquire the ability of 'cyclic-movement' in the course of development, since some subjects were able to adequately produce long-distance *wh*-questions in the experiment of this study. The result of Experiment 1 suggests that in SLA the strategies are different between production and interpretation, and supports the hypothesis of this study.

Let us next consider the results of Experiment 2. The results match the hypothesis in (32). JE tended to prefer the matrix interpretation. The tendency is caused by the 'detect nearest' strategy. The subjects who selected the embedded interpretation as well like the subjects in Hawkins & Hattori (2006) are at the stage of development in which they can also use the 'detect gaps' strategy. And in both the present study and Hawkins & Hattori (2006), Subjacency was less likely to be violated by the subjects. This may be caused by the *wh*-types. In the Superiority-type sentences, the argument *wh*-phrase *who* is placed at the sentence initial position, while the adjunct *wh*-phrase *when* is adjoined in the Subjacency-type sentences. It is natural that one does not detect a gap of *when* in an embedded clause, because it is not necessary adjoined in the embedded clause.

So far as we have seen in this study, JE is in the 'detect nearest' stage. Judging from the results of Hawkins and Hattori (2006), high proficient Japanese speakers of English are in the 'detect gaps' stage.

6. Concluding Remarks

As suggested in Hawkins & Hattori (2006), we should be cautious when we interpret apparent target-like L2 performance as evidence for successful acquisition. Furthermore, their claim that some uninterpretable features are not available in SLA is also seemingly prudent. The hypothesis within the MP framework requires that the uninterpretable features be deleted before LF. They do not have any semantic imports or any cues for L2 learners. That is, there exists no visible evidence for learners to know how the grammar computes in terms of the features.

However there are some facts which cannot be explained by Hawkins & Hattori's (2006) analysis. We, thus, claimed that intermediate learners use the economical strategies in the early stage of SLA, and even in SLA the strategy is different between production and interpretation, as shown in (31) and (32).

It is likely that there are various factors involved in the discrepancy between production and construal. One possible reason for the discrepancy, as we have claimed in this study, is that L2 learners use the strategies for construal different from those used in production. But what is important is that in both cases, their performance is controlled by general principles of economy.

One important question unanswered is how learners shift from the stage that they use the strategies proposed here, to the next stage that they can properly perform. Although there remain some facts not explained in detail, the analysis of this present study sheds some light on not only the acquisition of *wh*-movement, but also the difference in strategies between production and interpretation, which have not been given enough attention.

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2タイプの方略：日本人学習者による英語 *wh* 疑問文習得

隈上　麻衣
（九州大学大学院）

日本人学習者による英語 *wh* 疑問文習得に関する最近の研究である Hawkins & Hattori (2006)は、(i) 一見したところ正しい第二言語運用は、必ずしも習得が成功した証拠であるとは限らないことを指摘し、(ii) 母語で用いられていない解釈不可能素性を第二言語で用いることはできないと主張している。本稿では、学習者の第二言語運用の捉え方に関する Hawkins & Hattori (2006) の指摘(i)は受け入れるが、Hawkins & Hattori (2006) の形式素性に基づく分析では説明できない事実を取り上げる。そして、学習者の習熟度の違いや、解釈と運用の間で、第二言語運用には一貫性が欠如していることから、少なくとも習熟度が中級レベルの学習者は、解釈と産出それぞれにおいて、経済性に従った異なる方略を用いて第二言語運用を行っていると提案する。

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